ART. XXIV.—*Report of the Recent Yellow Fever Epidemic of British Guiana.* By DANIEL BLAIR, M. D., Surgeon-General of British Guiana. 8vo. pp. 91: London, 1856.

THE Report of Dr. Blair is one of considerable interest. Besides presenting a summary of the history of yellow fever as it prevailed in British Guiana, in the years 1852 and 1853, it indicates several important points in reference to the symptomatology and morbid anatomy of the disease that have not been prominently noticed by previous observers.

From the beginning of 1845, the health of the seamen in the harbour of Georgetown, Demerara, and of the inhabitants, generally, of the entire colony of British Guiana, was, we are informed, good. During four months of 1850, from June to September inclusive, mumps became epidemic and epizootic, being very fatal to cattle. From the latter part of July to the latter part of August, of the ensuing year, a malignant influenza swept over the country and destroyed many of the feeble and dissipated among the Coolie and Portuguese immigrant population, but was scarcely felt by the seamen. In fact, until the end of 1851, the harbour of Georgetown might have ranked, we are assured, among the healthiest in the world; and no disease existed in the colony of which the newly arrived European or North American need have had the slightest apprehension.

The years 1851 and 1852 were remarkable for the favourableness of the seasons, indicated by the extraordinary average yield of the sugar crops. From 1849, a great change took place in the distribution of rain over the colony. That year was the acme of the rainy years. Previously, and up to 1851, the rain and dry weather appear, in the meteorological charts, gathered up in large masses, but since then there has been a less quantity, and greater dispersion. During 1851, the rain was so equally distributed over all the months, that no great washing or drying of the country took place.

"The meteorological characteristic of the weather preceding and accompanying the advent of the yellow fever, therefore," remarks Dr. B., "was *the absence of any decided dry, or any decided rainy season.* It was favourable to vegetation and agreeable to the feelings; and the minimum temperature of six years occurred in the month of January, 1852 (13th), when the thermometer fell as low as 67.7°. The coincidence of the invasion of yellow fever with the most cool and agreeable time of the year, corresponded in this respect with the epidemic that preceded ours along the windward coast of South America; that of Cayenne having commenced about the end of November, 1850, and that of Surinam about the end of January, 1851.

"Although our former epidemic had every appearance of local origin only, that from which the colony now suffers would seem to be the result of some general exciting cause acting consecutively along the southeastern seaboard of America, which, beginning at the Brazils, passed on to French, then Dutch, then British Guiana—thence to the West India Islands, New Orleans, and, finally, Bermuda. Had the winter not interfered, probably Philadelphia and New York would have been reached. Although, if its diffusion was due to the agency of the trade-winds solely, whose course it followed, the latitude of Bermuda should have been its terminus. The hypothesis of a great epidemic wave, rising in the east, and flowing on westerly, only apparently suffers from a minute inquiry into its course—for, although Demerara was invaded at the end of 1851, while Berbice, which is easterly, or to windward, did not suffer seriously till the end of July, 1852, still, in New Amsterdam, the port and capital of the latter country, two fatal cases occurred as early as February, 1852, and one in May following; and it is to be considered, that this town (unlike Georgetown) is situated several miles above the mouth of its river, and may have been caught, so to speak, in the eddy of that great epidemic wave, which so peculiarly affects the sea margins.

"Although the present epidemic has been apparently more intense and dif-

fusive than its predecessor, and its origin seems referable to a foreign source, still it affects special localities as before; and the tenements which suffered most on a former occasion, have been again those of its severest visitations."

"The march of the epidemic, its dates and lines of diffusion, would indicate the influence of atmospheric currents on its progress. Outside the boundaries of epidemic influence there was safety. The danger seemed in some measure proportioned to the nearness of approach to the centre of infection; and several striking instances have occurred, of parties descending, on a visit, from the uplands in the interior, and the unaffected regions of the coast, falling victims to the infection of the town. Within its circumscribed range, the epidemic manifested local predilections, and though some places seemed permanently affected, the lines of infection occasionally shifted, as in the former epidemic, and infected and unaffected localities were temporarily in juxtaposition.

"Lulls and exacerbations in the general violence and intensity of the epidemic were frequently observed in its course. The first of these lulls occurred in the last half of the month of March, and the first exacerbation in June. By the end of August, another lull, but of short duration. In February and March, 1853, the epidemic power was intense. It moderated again till June, when it was renewed with great virulence. These lulls in the epidemic were as illusive as the lull of symptoms in the fatal progress of the disease; and it was often my painful duty to discourage the hopes that were so eagerly entertained by the authorities and the public, of the entire and speedy disappearance of the epidemic, and to resist, with apparent pertinacity, the repeated proposals for the return of the white troops to the military service of the colony.

"Although the epidemic sprung up at a delightful season of the year, when the general health was excellent, and, perhaps, irrespective of weather, yet, in its course it seemed materially influenced by meteorological conditions; and sometimes even diurnal variations were observable in the condition of the whole of the patients in the hospital, which could only be referable to atmospheric causes. A cool, dry, brisk air seemed to have a mitigating effect, while a hot, sultry, close, moist air increased the number of admissions, and aggravated the type of the disease, particularly on its immediately following the other meteorological state."

Dr. Blair notices the occasional blending of yellow with intermitting fever, and its modification in some cases by influenza. In June, 1853, smallpox became very prevalent, and was suspected in some cases to be of spontaneous origin. Mixed cases of smallpox and yellow fever occasionally occurred, the former disease predominating; if, after the stage of desquamation, smallpox patients were attacked with yellow fever, the latter then had its own course, unmolested. The coexistence of pneumonia and pleuritis with yellow fever, sometimes the one, and sometimes the other being primary, was of frequent occurrence, particularly among the Portuguese immigrants.

It is stated by Dr. B. that, in the course of the epidemic, several long-standing cases of chronic disease, to the consternation and surprise of the bystanders, terminated suddenly and fatally by black vomit without any precursory fever.

Not only was the epidemic, as a whole, subject to modifications and fluctuations, but the early individual symptoms of the disease also.

"Sometimes," remarks Dr. B., "the full complement of standard symptoms were present, sometimes they were imperfect or deficient, and sometimes displaced. At one time the diagnostic symptom was the supra-orbital headache. This, in the epidemics of Cayenne and Surinam, seems to have been the constant characteristic, accompanied, generally, by lumbar pain. At other times, the tongue symptoms alone were diagnostic. Sometimes their equivalent was observed in the fauces and uvula. In the Surinam and Cayenne epidemics our tongue symptoms do not seem to have been at all recognized. These variations and shiftings of the symptoms were not irregular or promiscuous, but *periodical;* and they continued steadily for several weeks together." "Intense surface heat, early albumen in urine, and early black vomit, were the character of the later symptoms; and smoky, pale urine, with perfect blood-corpuscles, took

the place of the straw-coloured or bilious urine, with its sediment of tube-casts and epithelial matter. Notwithstanding this variation of symptoms, they were never so defective as to prevent the formation of a correct estimate of the nature of the disease with which the practitioner had to deal. The variation of symptoms had sometimes a relation to the mode of accession of the disease. In the diarrhœal or choleroid cases, the tongue and head symptoms were seldom so early or developed."

It will he impossihle for us to follow Dr. B. in his most interesting account of the several symptoms of the disease.

The supra-orbital pain, and punctated tongue, Dr. B. considers as most valuable premonitory symptoms, the first, especially, giving uotice of an impending attack several days before it occurs. These symptoms, also, indicated the epidemic taint in some cases of intermittents, which resisted the ordinary treatment of such cases.

The frontal pain seems normally to belong only to the formative and febrile stages of yellow fever, and subsides spontaneously in the middle and late stages. It is sometimes described as in the orbits, more rarely in the upper part of the forehead; occasionally as extending to the occiput. It is usually attended by an increase of temperature over the forehead.

Dr. B. describes a *specific capillary irritation* that shows itself in the flush of the face, and which he pronounces as characteristic of yellow fever as the hectic of phthisis, or the fuliginous complexion of typhus.

"This suffusion," he remarks, "generally occupies a zone over the eyes, and about an inch above and below them. The eyes are injected, like those of a person *just awake*, but generally without any lachrymation or photophohia, although the iujection may be as intense as in ophthalmia. Sometimes the irritation extends to the palpebræ, to one or both, and sometimes only one eye is affected, but that so violently, as if the patient had been *stung*, or received a blow on the eyes." "The nares also may be found injected, with a coarse vascularity; the lips may be crimson or vermilion coloured; the tongue scarlet at tip and edges. If the fauces be examined, the roof of the hard palate will be sometimes found covered with a coarse network of capillaries, which extends to the uvula. If the practitioner is already satisfied as to the nature of the case, this examination of the fauces should be omitted, on account of the *vomituritis* generally induced by pressing down the tongue preliminary to the examination."

Dr. B. also remarks, that, upon a careful examination of the chest, a subcutaneous rash may sometimes be observed, which occasionally extends to the arms and abdomen. The face, chest, arms, and legs have likewise, in some cases, a slight purplish appearance after the second or third day, and sometimes the colour of a boiled lobster.

"This appearance varies much in degree, but may be detected by pressing the hand flat on the chest, when the fingers will for a short time be delineated in white with purple outline. This symptom occurs chiefly in the 'smouldering' form of the disease, and is often so deep as to conceal the jaundiced appearance of the skin."

The appearance of this *languid capillary circulation*, as it is called in the hospital case-books, is looked upon, says Dr. B., with favour. It would seem to indicate, he adds, that the congestions were directing themselves towards the periphery of the hody, thus relieving the vital internal organs from a part of their load. In these cases the skin is generally cool and moist, and sudamina occasionally appear.

The appearance of the tongue in yellow fever, and the variations presented by the organ in different cases, and in the different stages of the same case, are minutely detailed by Dr. B.; in these details, however, interesting as they are, we cannot follow him. The same remarks will apply also to his description of the condition of the urine, and the changes it undergoes in the course of the disease. He describes it as always acid in the first stage, and continuing so generally until convalescence, when it becomes alkaline, or until it becomes heavily charged with hile. He confirms the accuracy of Dr. Collings' observations in regard to albuminosity of urine as a characteristic of yellow fever. The

albumen generally appears on the second or third day; it has been found as early as the first day of illness, while, in a few cases, it did not appear till the day of death, and after black vomit had set in. It was seldom seen in aborted cases. In a few instances it appeared in these during convalescence. In three cases the albuminosity was *intermittent* for one or two days.

"Albumen appeared in every fatal case of normal duration. It sometimes ceased in convalescence suddenly, always before the yellow suffusion of skin and eye, or bile in the urine, disappeared, except in a single case, where Bright's disease seemed to be a sequel of yellow fever; the patient, after remaining in hospital upwards of two months, left with his urine still albuminous. Between the eleventh and twentieth day of gravior cases, it generally disappeared, and its disappearance formed the criterion for the discharge of the patient from the hospital. The colour of the precipitated albumen was never *white*, as it is in our cases of Bright's disease."

"The *turbidity* of the urine was not necessarily connected with its albuminosity. The urine may be deeply tinted with bile, and highly albuminous, and yet clear. The turbidity of the urine was caused by the presence of mucous epithelial matter, coagulated albumen, and casts of the urinary tubuli. It is probable that the free acid of the urine has a coagulating power, and sometimes communicates turbidity. The presence of mucus will have a similar effect, but the turbidity then is not general, but occupies a lower stratum of the fluid, and is light and floating there, while the supernatant liquid is clear. There is nothing distinctive or of importance in this mucous condition when the urinary secretion is copious. Perfect epithelial scales are rarely found in the sediment, but broken up epithelial matter is abundant." "Although albuminosity is almost always the antecedent to the presence of tube-casts, a case occurred in which these were found in non-albuminous urine."

The albuminosity of the urine furnishes, Dr. B. observes, one of the most obvious manifestations of yellow fever entering its second stage, and its extension to the great solid viscera.

"Cases have died even when the urine was full and free; but life is prolonged thereby; and no guarantee of safety in one epidemic was so sure as an unobstructed action of the kidneys; and no sign, not even black vomit, so dooming as a suppression of urine. Hope then was gone. No matter how desperate the condition otherwise, if there was copious transparent urine, though ever so coagulable, and black as ink from bile, the struggle was hopefully maintained. For it was felt that the system was still competent to the elimination or decomposition of the yellow fever poison. But *suppression* after the abundant appearance, or curdy aspect of albumen and tube-casts, rendered despair reasonable. The scanty oily-looking urine was generally present in cases that might be abandoned. The tube-casts had disappeared—for the capability of *washing out these plugs of the urinary tubules* no longer existed: they are irrecoverably choked; and the bulk of the scanty secretion seemed to be derived, not from the kidney, but the bladder itself."

A very instructive chapter is given by Dr. B. on the ejections from the stomach in yellow fever. In the early period of the attack the matters vomited are alkaline. When the second stage of the disease sets in, on the second, third, fourth, or as late as the fifth day of the disease, they become acid, and continue so to the close of the disease; the acidity being most decided during the production of black vomit. The acid discharge may, at first, consist of a quantity of clear, pale, almost limpid or slightly opalescent fluid. With this ejection the disease may terminate, or go on to a protracted period, without change in the matter vomited, usually, however, it is the precursor of the black vomit, the acid ejections becoming mixed to a greater or less extent, with snuff-like specks, before it merges into well-defined black vomit. "*Normal black* vomit," is described by Dr. B. "as having a laminar or granular sediment, of a deeper or paler shade of brown, sometimes verging on jet black, with a clearly defined supernatant serum of low specific gravity, and without mucosity, partaking of the colour of the sediment, but sometimes nearly limpid when the sediment is black, as if all the colouring matter had subsided. Many de-

viations from this standard occur from the presence of ingesta, hemorrhage, and excessive secretion of mucus."

"The sediment of black vomit seemed to consist of coagulated albumen and the débris of blood-cells. In no case in which the black vomit was normal to the eye, was a single perfect corpuscle observed. When pressed through a paper filter the colour is rendered considerably paler. The sediment of black vomit seemed more highly acid than the supernatant liquid—it makes a stronger impression on the test-paper. The sediment acts as a ferment on liquids containing sugar."

"The presence of ammonia in black vomit," according to Dr. B., "is universal, that is, it has always been found when looked for, and may be considered one of the tests of black vomit."

"During the former epidemic," Dr. B. informs us, "it was noticed in cases of black vomit, that, when it *preceded* the yellow suffusion, the prospects of life were improved. The relations of this fact were not then understood. Black vomit is significant of imminent danger, from the circumstance that it is the *dernier ressort* of nature to relieve that contamination of the circulation which has been produced chiefly by impairment of the function of the kidneys, and the retention thereby within the system, of the worn-out nitrogenous elements of the body and their poisonous metamorphoses. Now, if black vomit appear early in the disease, before its march has extended to the great internal viscera; before the bile function has been disturbed, or the urine rendered albuminous, it ceases to be the significant symptom which has obtained so much ill-omened celebrity. It is then the sign of a local, instead of a constitutional affection."

In the ensuing chapter we are presented with the observations of Dr. B., in reference to the condition of the blood in yellow fever, as relates to the epidemic of which he treats. From these observations it appears that during the first stage of the disease, in no instance could there be detected any really abnormal condition of colour, corpuscles, serum, or crassamentum, except sometimes the presence of bile. Changes of the blood were met with only in the last stages, and after death. Cases, nevertheless, terminated fatally after normal black vomit and hemorrhages, in which no unhealthy appearance of blood after death could be observed, except as to the bile tinge. The appearance of yellow fibrinous coagula in the heart was frequent after the worst cases, and what may be termed the texture of the blood often remained good. Blood passed off by stool, though of good crassitude and colour to the naked eye, is always found under the microscope with all its corpuscles ruptured. Which alteration Dr. B. considers to be, in great measure, due to chemical changes which occur after its extravasation.

During life, however, the blood is sometimes found altered. This alteration consisted chiefly in a change in the shape and condition of the corpuscles, and a deterioration of the fibrin. The fibrin is sometimes greatly diminished in quantity, at others, it seems to have lost, in a great measure, its power of fibrillation. The albuminous element appeared, by the rough test of its becoming solid by heat to coagulation point, to be sufficient.

"The healthy condition of the blood in yellow fever," observes Dr. B., "seems associated with free action of the kidneys, or copious black vomit, and alkaline exhalations of the breath. And the deterioration of the fibrin has an obvious relation to the amount of *free* ammonia remaining in the circulation. The changes in the *shape* of the corpuscles are probably due to alterations in the density and saline constituents of the serum. The blood of the cadaver in this epidemic, was in the vast majority of cases more or less ammoniacal."

In chapter 8, we are furnished with the observations of Dr. B. on the ammoniacal breath of yellow fever patients. From these observations it became apparent that the urea of the suppressed urine is eliminated from the system as a volatile salt, by its metamorphosis into a carbonate of ammonia, which, as such, is frequently found in the breath, occasionally in the black vomit and hæmatemesis, almost always in the stool; in two cases in the urine, always in normal black vomit in combination with an acid, and, indeed, apparently pervading all the tissues of the body.

In the chapter on the sequelæ of yellow fever, Dr. B. states that relapses

were of frequent occurrence, occasioned most likely, in great measure, by a return of the patient to the focus of infection after discharge from the hospital. Those relapses, we are told, were almost exclusively among the aborted cases. They frequently recurred, and were aborted several times. The primary attack was generally, but not always, without albuminosity of urine, and frequently the relapse also; generally, however, in the relapse albuminous urine was expected, even if the disease was again aborted, during convalescence. Only two relapses occurred after the disease had run on to black vomit, both of which were readily aborted, although in one the relapse proceeded to albuminous urine. The tendency to relapse or second attack was generally within the first month after the primary attack.

Dr. B. describes four distinct varieties in the mode of death in uncomplicated yellow fever; and these are sometimes blended: namely, syncope, uræmia, apoplexy, and asphyxia. Death from syncope may arise from excessive discharges of black vomit, or from hemorrhage, as excessive epistaxis, bleeding from the mouth and gums, or from the black vomit and hemorrhage combined. If before death the urine be suppressed, and the black vomit is not copious or has ceased, the circulation becomes contaminated, and when this condition acts upon the brain in its mildest form, the effect is not unlike alcoholic inebriation. In one case the patient, on the night of his death, sat up in bed, drank beverages, and joked with the shipmasters around him; in another, the patient, within a few hours of his death, was found sitting up in his chair, and regaling himself with his tobacco pipe. If all the excretions and secretions be locked up, as occasionally happens, the symptoms of uræmic poisoning become more violent, the sensorium painfully affected, irritability of temper, screams, and wild ravings ensue, followed by convulsions, coma, and death.

Death by apoplexy, caused by congestion and extravasation of blood on the brain, was observed in several cases. In one case death from asphyxia was the result of laryngeal suffocation, and in two, of pulmonary apoplexy.

We must pass by without notice the chapter on the pathological anatomy of yellow fever, though replete with interest, and can only give the following concluding paragraphs of the chapter on its diagnosis and prognosis.

"Yellow fever, although it may be engrafted on an intermittent, when once formed, has no intermissions. It is a fever of one paroxysm, without the crisis of perspiration, and when it is over, health is restored, or the disease goes on inducing its ultimate changes without febrile action. The time of seizure is different with yellow fever from that of our permanently endemic fevers. It generally comes on in the night half of the twenty-four hours; while with us, all our miasmatic fevers, whether quotidian, double quotidian, or tertian, in the immense majority of instances, occurred at mid-day. And, if we follow intermittent into its sequelæ, we find no resemblance between the two diseases. There is not the quick restoration of health usual in yellow fever, nor the bloody furuncles of unhealthy convalescence, but, instead, enlarged spleen, anæmia, dropsy, and colliquative dysentery."

"The number of the characteristic symptoms present, and the degree in which they are manifested, furnish criteria of the severity of the case, and the ratio of danger. A slow pulse and moderate temperature of the body, and quiet stomach, are always favourable indications. But the more fiery crimson the tip and edge of the tongue, the more irritable the stomach, the severer the headache, the worse the prognosis of the first stage, and *vice versâ*. Slight or moderate epistaxis is a sign of little prognostic value in any stage; but streaks of blood in the early vomit, indicates much danger; while the same, during the stage of black vomit, or after acid elimination has set in, is favourable, if the corpuscles are found entire. In the second stage, the earlier or more complete the suppression of urine, and the more copious the ejection of black vomit, the more imminent the danger. But if the urinary secretion continue, and the black vomit be scanty from the first, or is afterwards suppressed, the patient may yet survive. Urine simply albuminous is a less serious sign than when it also contains tube casts; but if these are thin and few in number, they do not add much to the gravity of the indication. Free, copious urine, no

matter how dark or bilious, is the most favourable of any single sign. If the urine be scanty, and it be loaded with tube casts, entangled in epithelial and fibrinous matter, forming a light buff coloured sediment, it indicates a complex lesion of the secreting structure of the kidney. It is the urine symptom in its maximum of severity, and is as fatal as if the suppression had already occurred. Blood corpuscles in the urine were not looked on with apprehension. A faltering of the articulation is a bad prognostic, and a difficulty of protruding the tongue enhances it." "The danger of the case is enhanced by its inflammatory complications, and by hypertrophy of the heart. The recency of residence in a temperate climate, the *race* or complexion of the individual; the fact of his previously having suffered from a gravior attack, or an aborted one, will enter into an estimate of his chances of recovery."

In the ensuing chapter some of the points connected with the etiology of yellow fever are discussed.

From the observation of the epidemic of 1852–53, it would appear, that, although a certain high average temperature is required for the generation and continued existence of the efficient cause of yellow fever, it has not its genesis from any known combination of meteorological elements, and may appear at a time when these are highly favourable to general health and comfort. It would appear further, "that the laws of its diffusion differ from those of gases; that it is impelled by atmospheric currents, but seems to possess some power of locomotion," as indicated by its shifting lines of infection and gyratory movements; "that the development of its power was gradual, from its feeble and diluted manifestation at the end of October, till its perfectedness at the end of December, and its maximum of intensity a month afterwards; that during the course of its progress it showed marked variations of epidemic power; that in constitutions apparently the same, the system was affected in various degrees, as if the poison acted in proportion to its quantity, and as a poison and not a ferment; that its first impression on the system seemed in many cases local and circumscribed, although attended with the usual constitutional disturbance; that it can actively occupy the body simultaneously with other affections, and may be either subordinate or paramount in the issue; that though the extensive application or saturation of the system by the efficient cause eventuates in a spontaneous outbreak of the disease in the individual, there are circumstances which accelerate its action and augment its intensity, and others which retard or entirely obviate and render it inert."

Previously to considering these two set of circumstances, Dr. B. considers those facts which bear upon the question of contagion. Numerous observations are adduced in which the freest intercourse with the sick took place without the occurrence in a single instance of the unquestionable propagation of the disease; one or two cases, however, are referred to, which, it is admitted, may be open to suspicion, till all the circumstances in connection with them are explained.

"I have," Dr. B. observes, "stated thus all the facts that have come to my knowledge during the course of the epidemic, which favour the doctrine of the personal transmissibility of yellow fever. They were earnestly looked for among the countless opportunities for observation, and no others could be discovered. Those which were found have been honestly declared. In such a poverty of positive proof in the affirmative of the doctrine, it is no argument against those who disbelieve in the doctrine of contagion, to assert that their proofs amount to negative evidence only. The experience of the present epidemic has confirmed that of the past, and the idea of contagion, which was then unanimously relinquished, has not been revived. Neither do facts countenance the fanciful compromise which some have offered as a settlement of what is scarcely a question among those who in modern times have seen the disease with their own eyes, viz: that it is *the type of disease in which black vomit appears only which is contagious.* In Demerara we would as soon think of asserting that intermittent fever in some of its forms and types is contagious, as to predicate it of any of the manifestations of yellow fever."

Among the causes which accelerate the action and augment the intensity of the efficient cause of yellow fever, Dr. B. enumerates, heavy rains, with calms,

creating a damp, hot, steamy atmosphere, or the prevalence of land winds, which are cold, comparatively damp, and of low dynamic power. The return of a dry, cool, clear, elastic atmosphere, with sweeping trade-winds from the ocean, was always followed by mitigating effects. The *rationale*, Dr. B. remarks, is easy. The condition of the weather first referred to oppresses the cutaneous and pulmonary functions, and thereby lowers the tone of health and its power of resistance to the action of noxious agents, at the same time that the stagnation of the air is favourable for the accumulation of the atmospheric poison, whatever it may be.

The next predisposing and intensifying circumstance noticed is locality. In the last as in the former epidemic, the poisonous agent persisted in its predilection for low, damp, crowded places, and the neighbourhood of putrid exhalations, and woe to the unwary or reckless who lived or lingered in such places or exposed to such exhalations.

Fatigue and checked perspiration and long continued solar exposure also tended to precipitate the attack. The tolerance of the poison which those residents who had passed through the epidemic from its first feeble manifestations, had acquired, was seriously impaired by even a temporary removal from the colony, and a return to it within a few weeks. The depressing emotions of the mind were highly favourable to the action of the poison. Worry and vexation, crushing sorrow, panic, and even overwhelming joy, have each had its victims. Among the exciting causes of yellow fever, Dr. B. enumerates the presence in the body of other febrile and irritating affections. A paroxysm of intermittent fever, he remarks, would sometimes set the morbid train in motion, as also the primary and secondary fever of smallpox, or an attack of pneumonia or even bronchitis. The stench of bilge water seemed sometimes to be an exciting cause.

"One of the most favouring causes of the action of yellow fever poison was," according to Dr. B., "infancy. The constitution of the new born or young white creole was highly susceptible. He or she was truly in the category of new comers. Not only did the first cases in town occur in children, but they followed numerously and repeatedly. As these infants and children were not exposed to some of the physical and moral influences which favoured the attack in adults, their high susceptibility can be imputed to structural differences only.

"Many facts," says Dr. B., "came to my knowledge, which showed that *family predisposition* for yellow fever exists, and is evidenced under varieties of exposure. It was noticed in several cases that a scorbutic diathesis, or sponginess of gums in the individuals attacked, prognosticated the worst results. But the great predisposer—the pabulum on which the epidemic revelled—was the organization of the white who had recently arrived from an elevated or mountainous country beyond the tropics.

"On the other hand, in looking for the causes which operate in retarding, or mitigating, or entirely shielding from the action of the yellow fever poison in the infected localities, we find that cheerfulness of mind, active but not laborious occupation, regularity of habits, and avoidance of night air, sustain the tone of health and militate against the inroads of the prevailing disease. The appearance of the eruption of smallpox seems to supersede the yellow fever poison. The presence in the system of evacuant diseases, such as the advanced stages of phthisis when the tubercles have softened, and even gonorrhœa, seems to have a retarding power. Several instances in the hospital were observed of attacks supervening on the *heading up* of the discharging surfaces of burns, scalds, and wounds.

"Of all the protections, that of *complexion* was paramount. When the ships' crews were disabled by sickness (and that was in the majority of instances), their places were supplied by negro sailors and labourers. On board of many vessels, black labour alone was to be seen employed, yet among those labourers and stevedores a case of yellow fever was never seen." Of 7890 African (black) immigrants, none contracted yellow fever.

We have already so far exceeded our limits in the notice of Dr. B's. report

that we can afford room for a brief outline only of the chapter on treatment.

The primary object of treatment was, if possible, to abort the attack by the administration of a mixture of calomel and quinine. Twenty grains of the first, and twenty-four of the second, for an adult, given in some simple syrup or pap. This dose was repeated at intervals of four or six hours, to the extent of four doses, unless the attack was earlier arrested. If after three or four doses are given the disease is not cut short, little room is left for active interference on the part of the physician, although still much may be done in putting the patient in the best condition for sustaining the struggle, and keeping off intruding complications.

In preparing the irritable stomach for the reception of this abortive dose, creasote, we are told, had often an admirable effect.

The first dose of the calomel and quinine was followed by a suitable dose of a purgative mixture, composed of drachms ij of carbonate of magnesia with oz. ij of sulphate of magnesia, in oz. viij of peppermint-water.

The aborting dose of calomel and quinine should be used as early as possible in the attack. When a state of apyrexia is induced, it may be relinquished, the end is attained; but if the urine has become coagulable, or the epithelium of the tongue has begun to peel, it is of no use pushing it further, the time for its use is passed, and subsequent to this it will be a noxious irritant.

"Sometimes the disease is incompletely aborted, that is, although it does not proceed to the second stage, a certain amount of febrile action still continues after the resolvent has been pushed to a reasonable extent. It was the practice then to give half an ounce of camphor water and spirit of mindererus every three or four hours, till the skin became cool and soft. Should, however, the stage of acid elimination supervene, this medicine is stopped, and small doses of bicarbonate of soda and nitre (five to ten grs. of each) substituted."

When the mucous surfaces, as indicated by the tongue, were denuded of epithelium, the use of gum-water was decidedly beneficial. It lubricated, defended, and soothed the raw surfaces. The strength was generally three drachms of the purest powdered gum dissolved in six ounces of cold water; a tablespoonful being given every hour or two. For thirty-six or forty-eight hours of the most critical period of the disease, it is used without dissatisfaction on the part of the patient; after that it can be substituted by, or alternated with, arrowroot pap.

"When the heat of surface was ardent, the *wet sheet* or *blanket* was used for the reduction of temperature by evaporation, with frequently very good effect. But in the late stages of the disease, when the skin was cool or cold, the patient seemed to have an instinctive craving for its reapplication, and frequently asked to be put into it. There would appear to be two causes for this feeling. We find it to exist in cases in which black vomit has been copious, and the associated thirst distressing; also where there has been no black vomit of any consequence, and the breath is highly ammoniacal. In the former case the stomach ceases to be an *absorbing* viscus in anything like the proportion of its secretions and transudations. The skin is therefore employed in reducing the crasis of the blood by the absorption of water, as shipwrecked mariners are said to quench their thirst. But not only does the skin afford an inlet for the imbibition of diluting fluids, but the softening of the cuticle would seem to afford an additional outlet for the noxious elements of the circulation, and it is probable in this direction we must in future look for auxiliary means of relieving the blood of its poisonous metamorphosed and effete constituents, the onus of which is now thrown on such vital organs as the stomach and lungs.

"The *food* during the course of yellow fever should be of the blandest description; chicken tea, arrowroot, sago and barley water constituting the chief articles; and these should be taken when the stomach is at all irritable, in minute quantities at a time. This rule also applies to drinks of all kinds. The patient is greedy for a large draught of fluids, but by sucking them through a glass tube of small bore, or taking them by the tea or tablespoonful, they are much more likely to be retained. A cold infusion of oatmeal was found an

agreeable drink for the Scotch seamen, of which they did not seem to tire. A dislike of sweets was observed among the patients, and when lemonade was asked for, the usual quantity of sugar was objected to. Tea was found uniformly to disagree with the patients, and cause vomiting, particularly in the advanced stages. Dilute alcoholic drinks were given freely, and with good effect."

During the course of the disease, *auxiliary treatment* was required to meet contingent symptoms. Cupping, leeching, and blistering were found useful in relieving the primary head symptoms and irritability of stomach, when applied respectively to the nape of the neck or epigastrium. Tenderness over the liver seemed also benefited by these applications. Dr. B. has never seen any benefit resulting from their application over the kidneys, with the view of relieving that congestion of which albuminosity of the urine and suppression are the indices.

"When the primary reaction was violent, and the face was turgid, and the head symptoms severe, arteriotomy was performed and with benefit. In a few such cases, and when the patient was young, strong and full blooded, or where the dynamic congestions were so violent that the vessels yielded to the turgescence and impulse, and blood corpuscles without tube casts, or even but a haze of albumen, was present in the urine, the arm was opened, and free bleeding relieved the tension of the vascular system. In such cases convalescence was slow and unsatisfactory, but the immediate results had been beneficial.

"In general, the bowels responded easily to the action of mild purgatives; but a cluster of cases occurred about fifteen months after the commencement of the epidemic in which *croton oil* was required to follow the resolvent doses. *Hydrocyanic acid* was supposed beneficial in a few cases in abating primary irritability of the stomach, and being easily taken, may be borne in mind by the practitioner, as a variety of such resources are at times required. *Ether* was frequently attended with marked advantage in removing or abating the distressing symptom, hiccup, but it was also used as a diffusible stimulant, and when acceptable to the patient, is fully equal to brandy for that purpose."

Dr. B. remarks, that of all the auxiliaries which must be occasionally impressed into the service of the patient, by far the most important is *morphine*. It should never be given, however, when there is suppression or tendency to suppression of urine. Its beneficial effects are most visible and unqualified in those cases wherein the disease has been imperfectly aborted, in which, after a few doses of the *aq. acet. ammon.* and camphor water, it will induce a good night's rest, out of which the patient awakes free from disease. The maximum dose for an adult should never exceed eight drops of the solution of the acetate (one-fourth of a grain); and this dose should rarely be repeated within twenty-four hours. Morphine, we are told, is perfectly safe, while the urine is non-albuminous.

"The 'smouldering form' of yellow fever," according to Dr. B., "is best treated by rest, the recumbent position, cool drinks, and abstinence from any but the lightest food. The patient, however, should be closely watched, although interference is seldom required, the curative and conservative power of nature being adequate to the perfect restoration of health in almost all these cases. Inflammatory complications were treated on general principles; and in pneumonia the tartrate of antimony was borne well."

We must close our imperfect notice of this most interesting report with Dr. Blair's pathological definition of yellow fever.

"The proximate cause of yellow fever is an aërial poison which impinges against the exposed mucous surfaces, and there excites in the contiguous capillaries a specific irritation which extends itself in a varying degree to the whole capillary system. The chief anatomical results of this irritation are epithelial desquamation, exfoliation of basement membrane, and textural lesion of the capillary tubes, occasionally amounting to their entire disintegration. The morbid phenomena, supplementary to the febrile reaction, are the compound results of capillary congestion, extravasation, and hemorrhage, and of a circulation contaminated by retained excretions." D. F. C.